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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/759,974

01/15/2004

William T. Futral

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EXAMINER

WU, CHENG CHIEN

ART UNIT

PAPER NUMBER

2609

MAIL DATE

DELIVERY MODE

07/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/759,974

Applicant(s)

FUTRAL, WILLIAM T.

Examiner

CHENG-CHIEN WU

Art Unit

2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/15/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-32 of U.S. Application 10/759974 were filed 1/15/2004. Claims 1 - 20 have been cancelled, and claims 21- 32 are presented for examination.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 21, 22 and 24** are rejected under 35 U.S.C 102(e) as being anticipated by **Forin** (US Patent #6594701 B1).

As per claim 21, Forin clearly discloses that a first apparatus (See, Fig 3, sender 60) comprising:
one or more buffers (See Fig. 3, send buffer 68);
a kernel agent (See Fig. 3, VI kernel agent 94);
a first interface (See Fig. 3, OS communication interface 88) to issue one or more commands to the kernel agent to initiate establishment of a connection between the first apparatus (See Fig. 3, sender 60 controls I/O device 70 with communication link 92

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through kernel agent 94, column 11, lines 32-34) and a second apparatus (See Fig. 3, receiver 62) (column 14, lines 36-45), and to post one or more data transfer requests to one or more queues. (See Fig. 3, column 14, lines 46-52); and a second interface (See Fig. 3, I/O device 70) capable of, in response to the one or more data transfer requests (The I/O device 70 may comprise any type of device for sending and receiving data in response to requests from an application, column 11, lines 18-20), at least one of issuing data from the one or more buffers to the second apparatus (column 15, lines 10-20) and transferring data received from the second apparatus to the one or more buffers (column 2, lines 56-61; column 16, lines 5-15).

As per claim 22, Forin clearly shows and discloses the claimed invention as **applied to claim 21 above**, and in addition, **Forin** further teaches wherein: the first interface comprises a virtual interface (See Fig 3, Virtual interface 96); and the second interface comprises a network interface (The I/O device 70 may comprise any type of device for sending and receiving data in response to requests from an application. For example, the I/O device 70 may comprise a network interface adapter, column 11, 18-20).

As per claim 24, Forin clearly shows and discloses the claimed invention as **applied to claim 21 above**, and in addition **Forin** further teaches wherein: the first apparatus is capable of being coupled via the second interface to a fabric coupled to the second apparatus (See Fig 2, The communication link 64 may comprise a LAN, a WAN,

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a SAN, or any other medium for transferring signals between connected devices, column 11, lines 7-9).

4. **Claims 25 and 26** are rejected under 35 U.S.C 102(e) as being anticipated by **Barkey et al.** (US Patent #5825748).

As per claim 25, Barkey et al. clearly discloses that a method comprising: if a number of available credits is at least sufficient to permit a transfer of data to occur, transferring the data from a first device (See Fig. 1, sender) to a second device (See Fig. 1, receiver) (See Fig 2a, If there is a data segment to be sent, then processing determines whether the available credit count is greater than zero 52, column 29-31; Once a credit is available, then the data segment is sent 54. column 8, line 35); and if the number of available credits is not sufficient to permit the transfer to occur, waiting for a change in the number of available credits to occur prior to transferring the data from the first device to the second device (If "no", processing waits until a credit becomes available, column 8, lines 32-33).

As per claim 26, Barkey et al. clearly shows and discloses the claimed invention as applied to claim 25 above, and in addition, **Barkey et al.** further teaches wherein: the number of available credits represents one or more buffers available to store the data (Typically, the credits reflect the unused buffer space at each node, column 1, lines 48-49; At the time the link is established, the ender is allocated a number of credits. Each credit represents permission to transmit one data segment

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over the data link to the receiver, column 2, lines 5-7)

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Forin** (US Patent #6594701 B1) in view of **Ward** (US Patent #6549540).

As per claim 23, Forin clearly shows and discloses the claimed invention as **applied to claim 21 above**, except for wherein: the second interface comprises a channel adapter.

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In the same field of endeavor, **Ward** discloses that wherein: the second interface comprises a channel adapter (The NGIO architecture uses a plurality of "links" or physical connections to connect each I/O controller to a switch. The switch can then connect the I/O controllers to a specialized DMA engine called a "channel adapter" which transfers data between the I/O controllers and the memory, column 1, lines 54-65).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a channel adapter because it can significantly increase data throughput between the memory and I/O controllers and there is a need for further increasing throughput of switched link architectures.

8. **Claims 27-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Barkey et al.** (US Patent #5825748) in view of **Forin** (US Patent #6594701 B1).

As per claim 27, Barkey et al. clearly shows and discloses the claimed invention **as applied to claim 25 above**, except for wherein: the first device comprises a node; and the second device comprises a host.

In the same field of endeavor, **Forin** discloses that wherein: the first device comprises a node (See Fig. 1, The remote computer 49 may be another personal computer, a server, a router, a network PC, a peer device or other common network node, column 9, lines 15-18); and the second device comprises a host (See Fig 1, The personal computer 20 may operate in a networked environment using logical

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connections to one or more remote computers; such as a remote computer 49, column 9, lines 13-15).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention to combine the teaching of Barkey et al and with the teaching of Forin because conventional flow control methods may not communicate accurate buffer size information to the sender and there exists a need for methods and systems for controlling flow between a sender and a receiver that alleviate the difficulties with conventional flow control techniques.

As per claim 28, Barkey et al. clearly shows and discloses the claimed invention **as applied to claim 25 above**, except for wherein: the number of available credits is represented by a value stored in the first device; and the method also comprises changing the value in response to a write operation issued from the second device.

In the same field of endeavor, **Forin** discloses that wherein the number of available credits is represented by a value stored in the first device (See Fig. 3(a), The credit list reader/processor 75a (sender) may receive the credit list and process the credits in order to send data to the receiver, column 17, lines 21-23; the credit message reader/processor may maintain a separate credit message buffer for each data connection, column 16, lines 13-15); and the method also comprises changing the value in response to a write operation issued from the second device (See Fig 2, the credit list builder/communicator 83 (receiver) preferably determines when to communicate new

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credits to the sender. Determining when to provide the sender with new credits may be accomplished in any number of ways, column 17, lines 39-42).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention to combine the teaching of Barkey et al and with the teaching of Forin because conventional flow control methods may not communicate accurate buffer size information to the sender and there exists a need for methods and systems for controlling flow between a sender and a receiver that alleviate the difficulties with conventional flow control techniques.

As per claim 29, the combination of Barkey et al and Forin as applied to claim 28 above, and in addition Forin further teaches wherein: the write operation comprises a remote direct memory access (RDMA) operation (In RDMA write operations, the receiver may send a list of credits directly to the memory of a remote machine on which the sender executes, column 3, lines 54-56).

As per claim 30, Barkey et al. clearly shows and discloses the claimed invention as applied to claim 25 above, except for wherein: the first device comprises: a first interface to issue one or more commands to initiate establishment of a connection between the first device and the second device, and to post one or more data transfer requests to one or more queues; and a second interface capable of, in response to the one or more data transfer requests, issuing the data from one or more buffers to the second device.

In the same field of endeavor, **Forin** discloses that wherein: the first device (See Fig 3, sender 60) comprises: a first interface (See Fig. 3, OS communication interface 88) to issue one or more commands to initiate establishment of a connection between the first device and the second device (See Fig 3, receiver 62) (column 14, lines 36-45), and to post one or more data transfer requests to one or more queues (column, lines 46-52); and a second interface (See Fig. 3, I/O device 70) capable of, in response to the one or more data transfer requests (column 11, lines 18-20), issuing the data from one or more buffers to the second device (column 15, lines 10-20).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention to combine the teaching of Barkey et al and with the teaching of Forin because conventional flow control methods may not communicate accurate buffer size information to the sender and there exists a need for methods and systems for controlling flow between a sender and a receiver that alleviate the difficulties with conventional flow control techniques.

As per claim 31, the combination of **Barkey et al** and **Forin** as applied to **claim 30 above**, and in addition **Forin** further teaches wherein: the first interface comprises a virtual interface (See Fig 3, Virtual interface 96); and the second interface comprises a network interface (the I/O device 70 may comprise a network interface adapter, column 11, 18-20).

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As per claim 32, the combination of **Barkey et al and Forin** as applied to **claim 30 above**, and in addition **Forin** further teaches wherein: the first interface is capable of issuing the one or more commands to a kernel agent (column 14, lines 36-40).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHENG-CHIEN WU whose telephone number is (571) 270-1217. The examiner can normally be reached on Monday-Friday 8:00-5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, CHARLES GARBER can be reached on (571) 272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Cheng-Chien Wu
Patent Examiner
July 5, 2007

A handwritten signature in black ink, appearing to read "Yuwen Pan". The signature is written in a cursive, flowing style with a long horizontal stroke extending to the right.